

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No. 10/649,439

Inventor: Uma Arun

Title: ALGORITHM FOR INTELLIGENT SPEECH
RECOGNITION

Filed via EFS

Filed: August 27, 2003

Group Art Unit: 2626

Examiner: Natalie Lennox

Attorney Docket: GP-303940

SECOND APPEAL BRIEF

Board of Patent Appeals and Interference
US Patent and Trademark Office
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

The Appellant is currently appealing the rejections made in the Office Action dated April 25, 2008. That Office Action followed Appellant's filing of the first Appeal Brief from which the Examiner re-opened prosecution and again rejected claims 1-25 under 35 U.S.C. §103(a). The Appellant respectfully traverses and appeals those rejections.

(i) Real Party in Interest

The real party in interest is the assignee of the appellant inventor who assigned all of his right, title and interest to General Motors Corporation, a Michigan corporation, having its principal place of business at 300 Renaissance Center, Detroit, Michigan 48265-3000.

(ii) Related Appeals and Interferences

There are no other appeals and/or interferences known to the Appellant, his assignee, and/or legal representatives that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

(iii) Status of Claims

In the Office Action of April 25, 2008, claims 1-25 were rejected under 35 U.S.C. §103. The application does not contain any other claims. This appeal covers the rejections of claims 1-25.

(iv) Status of Amendments

No amendment to the claims has been entered subsequent to the final Office Action.

(v) Summary of Claimed Subject Matter**Independent Claim 1 –**

Independent claim 1 is directed to a method for providing a speech recognition system to adjust to premature enunciator commands (Fig. 2; Page 9, Lines 11-12). In general, the method includes activating the speech recognition system (Fig. 2, Block 210; Page 9, Lines 13-15), receiving speech input from a user before the system is ready to receive speech input (Fig. 2, Block 230; Page 9, Lines 27-28), determining that the user has spoken prematurely (Fig. 2, Block 230; Page 9, Line 29), and adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input (Fig. 2, Block 260; Page 10, Lines 13-18).

Independent Claim 8 –

Independent claim 8 is directed to a computer readable medium storing a computer program for a speech recognition system to adjust to premature enunciator commands (Page 2, Lines 17-18). The computer program comprises computer readable code for activating the speech recognition system (Fig. 2, Block 210; Page 9, Lines 13-15), computer readable code for receiving speech input from a user before the system is ready to receive speech input (Fig. 2, Block 230; Page 9, Lines 27-28), computer readable code for determining that the user has spoken prematurely (Fig. 2, Block 230; Page 9, Line 29), and computer readable code for adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user input (Fig. 2, Block 260; Page 10, Lines 13-18).

Independent Claim 15 –

Independent claim 15 is directed to a system for providing speech recognition that adjusts to premature enunciator commands (Fig. 2; Page 10, Lines 17-18). The system includes a means for activating the speech recognition system (Fig. 2, Block 210; Page 9, Lines 13-15), a means for receiving speech input from a user before the system is ready to receive speech input (Fig. 2, Block 230; Page 9, Lines 27-28), a means for determining that the user has spoken prematurely (Fig. 2, Block 230; Page 9, Line 29), and a means for adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input (Fig. 2, Block 260; Page 10, Lines 13-18).

Independent Claim 21 –

Independent claim 21 is directed to a method of using a speech recognition system to adjust to commands of premature enunciators (Fig. 2; Page 9, Lines 11-12). The method comprises activating a speech recognition system (Fig. 2, Block 210; Page 9, Lines 14-15), indicating to the user that the system is ready to receive speech input (Fig. 2, Block 220; Page 9, Lines 20-21), listening for speech input after a predetermined time delay (Page 9, Lines 24-26), recognizing that the user has spoken before the system was ready to receive the speech input (Fig. 2, Block 230; Page 9, Line 27-29), and thereafter indicating to the user via a prompt that the system is again ready to receive speech input (Fig. 2, Block 230; Page 11, Lines 9-11), starting a listening period before the prompt is complete (Fig. 2, Block 260; Page 10, Lines 14-18), receiving the speech input (Fig. 2, Block 270; Page 10, Lines 19-21), and filtering the received speech input to remove noise residue due to the prompt (Fig. 2, Block 280; Page 10, Lines 23-25).

Although the Appellant has provided the summary of claimed subject matter with references to specific embodiments of the invention to comply with the requirements set forth in the relevant provisions of 37 C.F.R., this summary has been provided to aid the Board in evaluating the appeal and is not intended to limit the meaning or definition of any terms in the claims. Furthermore, it should be appreciated that the above-provided reference numerals and pages/line numbers are only for exemplary purposes, as other instances and/or embodiments of the claimed elements could appear elsewhere in the application.

(vi) Grounds of Rejection to be Reviewed on Appeal

The issues on appeal are as follows:

1) whether claims 1-5, 8-12, and 15-19 are unpatentable under 35 U.S.C. §103(a) in view of French-St. George and Pickering;

2) whether claims 6, 7, 13, 14, and 20 are unpatentable under 35 U.S.C. §103(a) in view of French-St. George, Pickering, and Pi; and

3) whether claims 21-25 are unpatentable under 35 U.S.C. §103(a) in view of French-St. George, Pickering, and Pi.

(vii) Argument**Claims 1-5, 8-12, and 15-19 –**

Claims 1-5, 8-12, and 15-19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over French-St. George in view of Pickering. This rejection is respectfully traversed for at least the reason that the combined teachings of French-St. George and Pickering does not render obvious Appellant's limitation of adjusting the speech recognition system after determining that the user has spoken prematurely to allow for earlier detection of user speech input.

Independent claim 1 recites "adjusting the [speech recognition] system after determining that the user has spoken prematurely to allow for earlier detection of user speech input." The Examiner has recognized and acknowledged that French-St. George does not disclose this step. To be sure, while French-St. George does disclose determining that a speech request was spoken too soon, see Fig. 10, it only teaches either commanding the user to repeat the request after the prompt (i.e., within the single established time window) or quitting the attempt to recognize speech input and switching the user to a touch screen input.

The Examiner has therefore relied upon Pickering to make up for the claim 1 subject matter missing from the primary reference. In particular, the Examiner asserts that "Pickering teaches adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input." Respectfully, this is wrong. Pickering is directed to a speech recognition system having barge-in capability such that a user need not wait for a prompt to be completed, but rather can interrupt the prompt at any time to provide speech input. The portions noted by the Examiner do not involve adjusting a speech recognition system at all, much less "after determining that the user has spoken prematurely" nor "to allow for earlier detection of user speech input," as recited in claim 1. Instead, the cited portions of Pickering teach starting a prompt (step 410), testing for speech input during the prompt (420) and, if detected, then processing the speech input (430, 435), and determining if the recognized speech is a valid response (440). If so, then playing of the prompt is stopped (460) and the remainder of the caller input is detected (465) so that the appropriate action can then be taken. If no valid speech is received, then the prompt is allowed to continue until it ends (450, 455) following which the

system waits for caller input (470). Nothing in the operation of the method teaches or suggests "adjusting the [speech recognition] system after determining that the user has spoken prematurely to allow for earlier detection of user speech input."

Pickering does not involve detection or adjustment based on detecting premature speech input because it is specifically designed to accept speech during playing of its prompt. That is, speech interruption during playing of the prompt is not premature speech input for which Pickering adjusts the system so that subsequent speech input can be detected earlier. As noted above, Pickering processes the received speech and either accepts it if valid or continues with the prompt and testing for speech input.

Nor has the Examiner identified anything from Pickering that teaches or suggests adjusting the speech recognition system so that subsequent speech input can be detected earlier. Rather, the Examiner's rejection appears to be on the basis that, because Pickering detects speech input during playing of the prompt (i.e., at an earlier time relative to the prompt than in French-St. George), that it therefore teaches or suggests adjusting a speech recognition system to allow for earlier detection of speech. But this conclusion does not logically follow. There is no basis from the references themselves, or that has been shown from the prior art generally, that would have led one of ordinary skill in the art to read Pickering as teaching adjustment of a speech recognition system following detecting premature speech to thereafter allow for earlier detection of speech input. "It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." In re Wesslau, 147 U.S.P.Q. 391, 393 (C.C.P.A. 1965) (also quoted in Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 230 U.S.P.Q. 416, 419 (Fed. Cir. 1986)).

Given that Pickering teaches the use of barge-in capability in a speech recognition system, a reasonable combination of Pickering's teachings with that of French-St. George would be to replace the premature speech detection and processing of Fig. 10 of French-St. George with the barge-in capability of Pickering so that, rather than detecting that speech occurred too soon relative to a prompt and asking for it to be repeated (as in French-St. George), the speech would instead be accepted and processed even if it occurred during the prompt (as in Pickering). But

there is no reasonable basis for concluding that Pickering suggests to one of ordinary skill in the art that, after detecting premature speech (as in French-St. George) then speech recognition system can be adjusted to allow for earlier detection of subsequent speech.

Thus, not only does Pickering fail to teach or suggest Appellant's step of "adjusting the [speech recognition] system after determining that the user has spoken prematurely to allow for earlier detection of user speech input," but also its combination with French-St. George would not suggest any such step. Thus, claim 1 patentably defines over these two references, whether considered singly or in combination.

While the above arguments have been addressed to claim 1, they are equally valid when applied to the rejection of independent claim 8 involving a computer readable medium and to rejection of independent claim 15 involving a system cast in means plus function language. Furthermore, claims 2-5, 9-12 and 16-19 each ultimately depend from one of these claims and should be allowed therewith.

Claim 4 –

As noted above, claim 4 depends from claim 1 and should be allowed therewith. Furthermore, claim 4 is separately patentable in that it recites the steps of "the speech recognition system providing a prompt indicating that the system is ready to receive speech input, receiving the user speech input before the system has started a first listening period that begins after a delay following the prompt, and thereafter providing a subsequent prompt and starting a subsequent." Neither reference teaches or suggests these steps. The Examiner asserts that "Pickering teaches starting a subsequent listening period at an earlier time relative to its prompt," but again identifies only that Pickering's system tests for speech input prior to completion of the prompt to permit barge-in. The cited portions of Pickering only teach a single instance of a prompt and speech input and so does not teach "starting a *subsequent* listening period at an earlier time relative to its prompt," as claimed. (Emphasis added.) Nothing in Pickering teaches or suggests modifying a listening period from one instance of prompt and associated speech input to the next. Accordingly, claim 4 is separately patentable apart from its dependence on claim 1.

Claims 6, 7, 13, 14, and 20 –

Claims 6, 7 13, 14, and 20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over French-St. George in view of Pickering and further in view of Pi. As discussed below, Pi does not make up for the above-noted deficiencies of French-St. George and Pickering as they were applied to the base claims.

Pi is similar to Pickering in that it teaches a speech recognition system having barge-in capability. It was cited by the Examiner solely on the basis that it teaches filtering to remove prompt echo as a part of speech recognition. Appellant submits that Pi does not include any disclosure that teaches or suggests the claimed step of "adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input." Thus, these claims are patentable on the same basis as the independent claims from which they depend.

Accordingly, Appellant respectfully submits that claims 6, 7, 13, 14, and 20 patentably define over French-St. George, Pickering, and Pi, and requests that the rejection of these claims be reversed.

Claims 21-25 –

Claims 21-25 also stand rejected under 35 U.S.C. §103(a) as being unpatentable over French-St. George in view of Pickering and further in view of Pi. This rejection is respectfully traversed because nowhere does French-St. George, Pickering or Pi teach or suggest the combination of steps (c) through (f). Rather, as discussed above, to apply Pickering's teachings to French-St. George would not result in the claimed combination of steps, but would instead result in the use of Pickering's barge-in capability in place of French-St. George's speech window processing method of Fig. 10. These references do not suggest the claimed iterative process in which, after (c) listening for speech after a predetermined time delay following an indication that the system is ready to receive speech input, and after (d) recognizing that the user has spoken before the system was ready to receive the speech input, the system then (e) provides the user with a prompt that it is again ready to receive speech input and then (f) starts a listening period before the prompt is complete. There is no reason stemming from any of these references, or from any established level of skill in the art, that one of ordinary skill in the art would modify the

listening period for speech input from a point in time following a delay after a prompt or other indication to a point in time before completion of a subsequent prompt, as recited in claim 21. Accordingly, that claim patentably defines over these references.

Accordingly, Appellant respectfully submits that the rejection of claim 21 is improper and should be reversed. Claims 22-25 each ultimately depend from claim 21 and should be allowed therewith.

Conclusion

In view of the foregoing, the Appellants request that the rejections of all claims be overturned and the claims be held allowable.

The Commissioner is authorized to charge any fees, or refund any overpayments, associated with this Appeal Brief to Deposit Account No. 07-0960.

Respectfully submitted,

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Date: November 25, 2008
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(viii) Claims Appendix

1. A method for a speech recognition system to adjust to premature enunciator commands, the method comprising:
 - activating the speech recognition system;
 - receiving speech input from a user before the system is ready to receive speech input;
 - determining that the user has spoken prematurely; and
 - adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input.
2. The method of claim 1, wherein the speech recognition system is activated selectively by the user.
3. The method of claim 1, wherein the activation of the speech recognition system is followed by informing the user that the system is ready to receive input and a listening period wherein the speech recognition system is able to receive speech input.
4. The method of claim 1, further comprising the speech recognition system providing a prompt indicating that the system is ready to receive speech input, receiving the user speech input before the system has started a first listening period that begins after a delay following the prompt, and thereafter providing a subsequent prompt and starting a subsequent listening period at an earlier time relative to its prompt.
5. The method of claim 4, wherein the earlier listening period begins 50 to 100 ms before the speech recognition system informs the user of its readiness to receive input.
6. The method of claim 1, wherein the speech recognition system filters sound overlays from user commands.
7. The method of claim 6, further comprising processing filtered speech input through the speech recognition system.

8. A computer readable medium storing a computer program for a speech recognition system to adjust to premature enunciator commands comprising:

computer readable code for activating the speech recognition system;
computer readable code for receiving speech input from a user before the system is ready to receive speech input;
computer readable code for determining that the user has spoken prematurely; and
computer readable code for adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user input.

9. The computer readable medium of claim 8, further comprising computer readable code to activate the speech recognition system selectively by the user.

10. The computer readable medium of claim 8, further comprising computer readable code for informing the user that the system is ready to receive input, and computer readable code for determining a listening period wherein the speech recognition system is able to receive speech input.

11. The computer readable medium of claim 8, further comprising computer readable code for the speech recognition system to start a listening period at an earlier predetermined time interval.

12. The computer readable medium of claim 11, further comprising computer readable code to begin the earlier listening period 50 to 100 ms before the speech recognition system informs the user of its readiness to receive input.

13. The computer readable medium of claim 8, further comprising computer readable code for filtering sound overlays from user commands.

14. The computer readable medium of claim 8, further comprising computer readable code to process filtered speech input through the speech recognition system.

15. A system for speech recognition that adjusts to premature enunciator commands, the system comprising:

- means for activating the speech recognition system;
- means for receiving speech input from a user before the system is ready to receive speech input;
- means for determining that the user has spoken prematurely; and
- means for adjusting the system after determining that the user has spoken prematurely to allow for earlier detection of user speech input.

16. The system of claim 15, further comprising means for the user to selectively activate the speech recognition system.

17. The system of claim 15, wherein the means to activate the speech recognition system comprise means to inform the user that the system is ready to receive input, and means for a listening period wherein the speech recognition system is able to receive speech input.

18. The system of claim 15, further comprising the means for the speech recognition system to start the listening period at an earlier predetermined time interval.

19. The system of claim 18, further comprising means for the earlier listening period to begin 50 to 100 ms before the speech recognition system informs the user of its readiness to receive input.

20. The system of claim 15, further comprising the means for the speech recognition system to filter sound overlays from user commands.

21. A method of using a speech recognition system to adjust to commands of premature enunciators, the method comprising:

- (a) activating a speech recognition system;
- (b) indicating to the user that the system is ready to receive speech input;

- (c) listening for speech input after a predetermined time delay;
- (d) recognizing that the user has spoken before the system was ready to receive the speech input; and thereafter
- (e) indicating to the user via a prompt that the system is again ready to receive speech input;
- (f) starting a listening period before the prompt is complete;
- (g) receiving the speech input; and
- (h) filtering the received speech input to remove noise residue due to the prompt.

22. The method of claim 21, wherein the predetermined time delay comprises a temporal pause occurring between indicating that the system is ready to receive speech input and listening for user speech input.

23. The method of claim 21, wherein the starting step (f) begins 50-100ms before the prompt is complete.

24. The method of claim 21, further comprising carrying out a plurality of iterations of steps (a) through (d) prior to steps (e) through (h).

25. The method of claim 24, further includes determining whether a user has exceeded an error count associated with the plurality of iterations of steps (a) through (d).

(ix) Evidence Appendix

None.

(x) Related Proceedings Appendix

None.